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ALLISON, ANDRAE S	
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SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	03/28/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)
	10/693,295	SCHILLER ET AL.
	Examiner	Art Unit
	Andrae S. Allison	2624

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *Amendment*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,4-12,14-24 and 26-32* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,4-12, 14-24 and 26-32* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☒ Notice of References Cited (PTO-892)
2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3)☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____.
4)☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
5)☐ Notice of Informal Patent Application
6)☐ Other: _____.

DETAILED ACTION

Response to Remarks

1. The Office Action has been issued in response to amendment filed January 5, 2007. Claims 1-4-12, 14-24, and 26-32 are pending. Applicant's arguments have been carefully and respectfully considered in light of the instant amendment, and are not persuasive. Accordingly, this action has been made FINAL.

Specification Objection

The specification has been amended to correct the typographical error. Therefore, the objection has been removed.

112 Rejections

Claims 17 and 18 have been amended to provide antecedent basis for all claim terms. Therefore, the rejection has been removed.

101 Rejections

Claims 31 and 32 have been amended to include the phrase "computer readable medium," thereby making both claims statutory. Therefore, the rejection has been removed.

Response to 103 Rejection Arguments

In response to Applicant arguments page on page 13 [p][002] that Lou fails to disclose at least the feature of that the training set of pixels to provide using a user input which exhibits sample color arrangement associated with the first and second visual texture and that Lou teaches away from classifying images on the basis of texture, the Examiner disagrees with Applicant. Lou clearly teaches a method for defining a boundary (differentiate true sky regions from other similarly color and textured subject matters; column 4, lines 33-34) separating a first region (e.g. non-sky-colored pixels, column 5, line 41) and a second region (e.g. sky colored pixels; column 5, line 41) of a digital image (200, Fig.2), the digital image including one or more color arrangements characteristic of a first visual texture of (see Fig 12 A, where the first region includes water and a boat which has various colors) of the first region and one or more color

arrangements characteristic of a second visual texture (sky color which includes non-uniform blue and almost white colors; column 6, lines 59-65) of the second region and receiving a user input providing training sets of pixel exhibiting sample color arrangements associated with the first and the second and first visual texture (note that various color sample of sky and negative examples that are neither blue, sky or water were provided as training sets; see column 8, lines 19-35). Although, Lou does not specifically mention receiving a user input, it would have been obvious that a user or operator would have to provided the inputs for the classifier. Furthermore, Lou clearly teaches classifying images on the basis of texture (see column 2, lines 59-62).

In response to Applicant arguments page on page 13 [p][003] that Lou fail to disclose that a neural network or a learning machine is trained to classify learning machine input sets based upon the training set, where each learning machine set inputs includes a pixel of interest and neighboring pixel, in which it determined which pixels of the digital image satisfy criteria for classification as associated with the first region and the second region by inputting learning machine inputs (including the pixel of interest and neighboring pixels) and outputting an indication of a region to which each pixels of interest belong, the Examiner disagrees with Applicant. Lou clearly teaches training a color classifier (note that a neural network is used in the training process, see column 8, lines 29-31) using color samples of sky and also note that negative examples that are neither blue, sky or water were also used during training (see column 8, lines 19-35). Lou also teaches that if the overall belief value of candidate region is above a certain threshold, the regions is declared a sky (see column 6, lines 18-19) and if gradient value

is above predetermined threshold, the region is considered a non-sky regions (see column 5, lines 52-61).

In response to Applicant's argument on page 15, [p][001] that Norton is not seem to remedy the deficiencies of Lou, the Examiner disagree. Norton teaches a method of masking an object (column 1, line 59) including identifying pixels (a pixel is identified if it in a certain range, column 16, lines 45-50) and decontaminating the identified pixels to define the boundary between the first and second regions (column 17, lines 1-4) and therefore cures the deficiencies of Lou. Applicant has also argued that Norton fails to disclose: i) a user input is received providing training sets of pixel exhibiting sample color arrangements associated with the first and the second and first visual texture, ii) a neural network or a learning machine is trained to classify learning inputs sets based upon training set, each learning machine input set including a pixel of interest and neighboring pixels and being derived from pixels in the digital image and iii) it is determined which pixels of the image satisfy criteria for classification as associated with the first region or second region, by inputting learning machine input sets and outputting an indication of a region which each of the pixels of interest belong. However, Norton was not relied upon for the rejection of the above-mentioned limitations.

In response to Applicant's argument on page 15, [p][002] that Boskovitz does not remedy the deficiencies of Lou or Norton, the Examiner, disagrees. Boskovitz teaches a method for multilevel image segmentation (page 247, [p][3], lines 1-2) that includes wherein: neighboring pixels represent is one of a three-by-three (see Fig 6b) square of pixels and a five-by-five square of pixels (see Fig 6c) and therefore remedy

the deficiencies of Lou and Norton. Applicant has also argued that Norton fails to disclose: i) a user input is received providing training sets of pixel exhibiting sample color arrangements associated with the first and the second and first visual texture, ii) a neural network or a learning machine is trained to classify learning inputs sets based upon training set, each learning machine input set including a pixel of interest and neighboring pixels and being derived from pixels in the digital image and iii) it is determined which pixels of the image satisfy criteria for classification as associated with the first region or second region, by inputting learning machine input sets and outputting an indication of a region which each of the pixels of interest belong. However, Boskovitz was not relied upon for the rejection of the above-mentioned limitations

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1-3, 5-7, 13-16, 20, 25 and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Luo et al (US Patent No.: 6,504,951) in view of Norton (US Patent No.: 5,912,994).

As to independent claim 1, Luo discloses a method for defining a boundary (differentiate true sky regions from other similarly color and textured subject matters; column 4, lines 33-34) separating a first region (e.g. non-sky-colored pixels, column 5, line 41) and a second region (e.g. sky colored pixels; column 5, line 41) of a digital image (200, Fig.2), the digital image including one or more color arrangements characteristic of a first visual texture of (see Fig 12 A, where the first region includes water and a boat which has various colors) of the first region and one or more color arrangements characteristic of a second visual texture (sky color which includes non-uniform blue and almost white colors; column 6, lines 59-65) of the second region, the method comprising: receiving a user input providing training sets of pixel exhibiting sample color arrangements associated with the first and the second and first visual texture (e.g. various color sample of sky and negative examples that are neither blue, sky or water, see column 8, lines 19-35); training a learning machine to classify learning inputs sets based upon training set, each learning machine input set including a pixel of interest and neighboring pixels and being derived from pixels in the digital image (note that the color classifier was trained using color samples of sky and negative examples that are neither blue, sky or water, see column 8, lines 19-35); Lou teaches determining using the trained learning machine (color classifier, column 8, line 47) based on one or more of the color arrangements, which pixels of the image satisfy criteria (if gradient value is above predetermined threshold, the region is considered a non-sky regions; column 5, lines 52-61) for classification as associated with the first region or second region, by inputting learning machine input sets and outputting an indication of a region

which each of the pixels of interest belong (if the overall belief value of candidate region is above a certain threshold, the regions is declared a sky column 6, lines 18-19). Luo further teaches identifying pixels of the image that are determined not to satisfy the criteria for classification as being associated either with the first region or the second region (marginal pixels; column 10, line 53) and decontaminating the identified pixels to define the boundary between the first and second regions by separating pixels of the digital image into pixels associated with the first region, the second, or the boundary (note that each pixel is classified either as sky, non-sky or marginal, see column 10, lines 33-55).

However, Luo does not teach identifying pixels and decontaminating the identified pixels to define the boundary between the first and second regions. Norton teaches a method of masking an object (column 1, line 59) including identifying pixels (a pixel is identified if it in a certain range, column 16, lines 45-50) and decontaminating the identified pixels to define the boundary between the first and second regions (column 17, lines 1-4). Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to have added the method of masking an object to the method of defining a boundary of Luo for detecting a boundary of a substantially color-homogeneous region of a frame of a digitized picture stock (column 1, lines 61-65) with "increased efficiency" (column 1, line 54). Also, the process of Norton allows for better segmentation of the various regions of the image and better identification of ambiguous pixels.

As to independent claim 31, this claim differs from claim 1 only in that claim 31 is a computer program product whereas, claim 1 is method and the limitations computer-readable medium comprising instructions and a processor are additively recited in the preamble. Lou clearly teaches a computer program product comprising instructions (column 3, line 6). Note the discussion above, Norton teaches computer-readable medium (memory, column 3, line 24) comprising instructions operable and a processor (12, see Fig 1).

As to claim 5, Luo teaches a method wherein the learning machine is a neural network (column 5, lines 4-5)

As to claim 6, Luo teaches a method wherein the indication represents a probability of the pixel being associated with the first region and a probability of the pixel of interest being associated with the second region (see column 8, lines 47-50, where a pixel classifier is trained to output a belief value between 0 and 1 a pixel, 1 indicating a highly likely to be blue sky and 0 indicating not very likely to be blue sky).

As to claim 7, Lou teaches a method wherein the indication is a floating point (number between a lower number (e.g. 0; column 8, line 45) and an upper number (e.g. 1; column 8, line 45) the lower number indicating a one-hundred percent probability of the pixel of interest being associated with the second region (e.g. 0 indicating the likelihood a pixel as non-sky; column 8, line 45) and the upper number indicating a one-

hundred percent probability of the pixel of interest being associated with the first region (e.g. 1 indicating the likelihood a pixel ideal blue sky; column 8, line 45).

As to claim 13, Luo teaches a method of training the learning machine to classify pixels (column 8, lines 20-21).

As to claim 14, Lou teaches a method wherein training includes selecting, based on user input, a training set of pixels used to train the neural network (column 8, lines 30-35).

As to claim 15, note the discussion above, Norton teaches the method wherein the training set of pixels selected includes pixels located within a particular range of the boundary (see Fig 6, step 208, where a range can be adjusted).

As to claim 16, note the discussion above, Norton teaches a method wherein the particular range is 20 pixels from either side of the boundary. In the spec (page 19, [p][22], line 10), Applicant states that the particular range can in the range of 2 to 100 pixels. Consequently, there is no significant advantage or disclosed criticality in choosing the particular range to be 20 pixels, therefore it would have been obvious that the particular range can be 20 pixels.

As to claim 20, note the discussion above, Norton teaches constructing from the

identified pixels a boundary mask that indicates which pixels of the digital image are the identified pixels (column 17, lines 16-21).

4. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Luo et al (US Patent No.: 6,504,951) in view of Norton (US Patent No.: 5,912,994) further in view of Wang et al (Pub No.: US 2003/0007683).

As to claim 4, Lou in view of Norton does not teaches a method wherein the learning machine is a support vector machine. Wang teaches a method of separating text from drawings (page 1, [p][0005], lines 1-2) that includes using a support vector machine as a learning machine (page 1, [p][0006], lines 4). Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to have substituted the color classifier of Luo with the support vector machine of Wang for classifying a stroke according to the slope curvature vector as either "text" or "unknown" (page 1, [p][0006], lines 8-10), because each reference region is for segmenting out one region from another and the use of a support vector machine is well known to segment regions of an image.

5. Claims 8-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Luo et al (US Patent No.: 6,504,951) in view of Norton (US Patent No.: 5,912,994) further in view of Littmann et al (NPL Document titled "Apative Color Segmentation – A comparison of Neural and Statistical Methods).

As to claim 8, Lou teaches wherein the lower number is -1 and the upper number is 1 (column 8, line 45). However Both Lou and Norton do not teach wherein the lower number is –1. Littmann teaches a method of comparing learning classifiers (page 175, [p][2], line 4-6) including wherein the lower number is –1 (page 176, [p][3], line 7). Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to have added the method of comparing classifier of Littmann to the method of defining a boundary of Luo as modified by Norton for classifying pixels in an image as foreground (e.g. hand, page 175, [p][4], line 6) and background (page 175, [p][4], line 6), and because this simply gives a commonly used value to represent one of the conditions.

As to claim 9, note the discussion above, Littmann teaches a method of converting the floating point number to an integer between a first integer and a second integer, the first integer indicating a one-hundred percent probability of the pixel of interest being associated with the second region, and the second integer indicating a one-hundred percent probability of the pixel of interest being associated with the first region (see page 179, [p][7], lines 7- 8, where the output the classifier are scale to gray values).

As to claim 10, note the discussion above, Littmann teaches a method wherein the first integer is 0 and the second integer is 256 (see page 179, [p][7, lines 8-9 where

the above mentioned gray values are in the range of [0, 256]). Also, these are the standard values for gray value image data.

As to claim 11, Luo teaches the criteria for classification as associated with the first region includes having an integer that exceeds a first threshold; and the criteria for classification as associated with the second region includes having an integer that is less than a second threshold (see column 9, lines 25-32, where the value of each pixel is proportional to its belief value and a global threshold is used to create a binary map, 1 is considered a potential sky pixel and 0 is considered a non-sky pixel).

As to claim 12, Lou teaches the method of claim 11, wherein: the first threshold is 170 and the second threshold is 85. There is no real significant advantage for choosing the first threshold to be 170 and second threshold to be 85, therefore it obvious that the first and second threshold can be 170 and 85 respectively.

6. Claim 17-19, 24, 26-30 and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Luo et al (US Patent No.: 6,504,951) in view of Norton (US Patent No.: 5,912,994) further in view of Boskovitz et al (NPL Document titled "An Adaptive Neuro-Fuzzy System for Automatic Image Segmentation and Edge Detection").

As to claim 17, the combination of Lou and Norton do not teach the method of claim, wherein: the neighboring pixels represent is one of a three-by-three square of pixels, a five-by-five square of pixels, and a seven-by-seven square of pixels.

Boskovitz teaches a method for multilevel image segmentation (page 247, [p][3], lines 1-2) that includes wherein: neighboring pixels represent is one of a three-by-three (see Fig 6b) square of pixels and a five-by-five square of pixels (see Fig 6c).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to have added the method for multilevel image segmentation of Boskovitz to the method of defining a boundary of Luo as modified by Norton for segmentation of intensity image (page 261, [p][1], line 1) without "require any human expert intervention, nor any a priori information about the input image" (page 261, [p][1], lines 20-23). Also, the use of 3x3 and 5x5 windows of pixels to process image data is extremely conventional and allows a large image to be processed in smaller, easier to process blocks.

As to claim 18, note the discussion above, Boskovitz teaches the method wherein the pixel being considered is located at a center of the neighborhood of pixels (see Fig 6a).

As to claim 19, note the discussion above, Boskovitz teaches the learning machine is a neural network (see Fig. 5); the neural network includes hidden nodes and gating nodes (see Fig. 5); and a gating node is associated with a corresponding hidden

node, the gating node being configured to determine, based on a location of the pixel of interest being considered, a contribution the corresponding hidden node makes to an output of the neural network (page 263, [p][1]).

As to independent claim 24, note the discussion of claims 1 and 19 above.

As to claim 26, note the discussion of claims 17 and 18 above.

As to claim 27, note the discussion above, Boskovitz teaches the method of training the gating node to determine, based on the location of the pixel of interest being considered, a contribution the hidden node makes to the output of the neural network (page 253, [p]4]).

As to claim 28, note the discussion above, Boskovitz teaches the method of training the hidden nodes to classify pixels of the digital image as either associated with the first region or associated with the second region, wherein the training of the hidden nodes occurs during the training of the gating nodes (page 253, [p]4]).

As to claim 29, note the discussion above, Boskovitz teaches the method further comprising: receiving input information specifying the location of the pixel being considered using input nodes; and providing the input information to the gating node (see Fig 5).

As to claim 30, note the discussion above, Boskovitz teaches the method futher compromising: receiving input information specifying the color arrangement of the corresponding neighborhood of pixels via input nodes; and providing the input information to the corresponding hidden node (see Fig 5).

As to independent 32, all the limitation are discussed above except: wherein the neural network includes a gating note associated with a corresponding hidden node, the gating node being configured to determine, based on a location of the pixel of interest, a contribution the corresponding hidden node makes to the output of the neural network. (Note the discussion of claim 24 above).

7. Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Luo et al (US Patent No.: 6,504,951) in view of Norton (US Patent No.: 5,912,994) further in view Simon et al (Pub. No.: US 2004/0170337).

As to claim 21, Both Luo and Norton do not teach a wherein decontaminating produces an opacity mask, the method further comprising: constructing from the identified pixels a probability mask; and combining the opacity mask and the probability mask. Simon teaches a method for enhancing an appearance of a face located in a digital image (page 2, [p][12], lines 3-4). Simon also teaches wherein decontaminating produces an opacity mask (generate alpha channel mask; page 6, [p][59], line 16-17),

the method further comprising: constructing from the identified pixels a probability mask (page 6-7 [p][61], line 8); and combining the opacity mask and the probability mask (page 8, [p][72], lines 11-12). Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to have added the method for enhancing an appearance an image of Simon to the method of defining a boundary of Luo as modified by Norton to "enable the retouching of portrait without requiring skilled operator intervention to make and supervise the retouching correction" (page 2, [p][13], lines 3-5).

As to claim 22, note the discussion above, Simmon teaches the method of combining the opacity mask and the probability mask includes multiplying the opacity mask with the probability mask (see page 7, [p][64], lines 4-5, where combining probability maps includes arithmetic multiplication).

8. Claim 23 is rejected under 35 U.S.C. 103(a) as being unpatentable over Luo et al (US Patent No.: 6,504,951) in view of Norton (US Patent No.: 5,912,994) further in view Mao (Pub No.: 2003/0063797).

As to claim 23, Lou teaches the method wherein the first region is a foreground (e.g. nonsky pixels such as the water and the boat in Fig. 12 A) of the digital image and the second region is a background (e.g. sky in figure 12 A) of the digital image. Note the discussion above, Norton teaches decontaminating includes excluding from the identified pixels a pixel that has no foreground colors (adjust border range, column 16,

line 41-43). However, Both Lou and Norton do not teach changing colors of a pixel that includes both foreground and background colors so that the changed identified pixels include only foreground colors. Mao teaches a selection tool for defining a border area (page 1, [p][0009] that includes teach changing colors of a pixel that includes both foreground and background colors so that the changed identified pixels include only foreground colors (change the color of a pixel in a target pixel map to foreground color) (page 4, [p][0048]).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to added the selection tool of Mao to the method of defining a boundary of Luo as modified by Norton to simplify "selection of complicated objects by providing a wide selection brush" (page 4, [p][0052], lines 2-4) and because each reference is for segmenting region of an image.

Conclusion

9. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Inquires

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Andrae S. Allison whose telephone number is (571) 270-1052. The examiner can normally be reached on Monday-Friday, 8:00 am - 5:00 pm, EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Joseph Mancuso can be reached on (571) 272-7695. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Andrae Allison

March 16, 2007

A.A.

JOSEPH MANCUSO
SUPERVISORY PATENT EXAMINER